REMARKS

Summary of the Office Action

Claims 1, 5, 55 and 56 are considered in the Office action.

Claims 1 and 5 have been rejected under 35 U.S.C. § 102(b) as anticipated by Steinmetz, Jr. U.S. Patent No. 5,600,579 ("Steinmetz").

Claims 55 and 56 have been rejected under 35 U.S.C. § 103(a) as obvious over Steinmetz in view of Paul R. McJones et al., "Evolving the UNIX System Interface to Support Multithread Programs," Proc. 1989 USENIX Winter Conf., pp. 393-404, Dec. 1989 ("McJones").

Summary of the Reply

Applicants have amended claim 1 and 55, and added new claims 57-58 to more particularly point out and distinctly claim the invention.

Reply to Rejections Under 35 U.S.C. § 102(b)

Claims 1 and 5 have been rejected under § 102(b) as anticipated by Steinmetz. Amended claim 1 recites a method for providing a design test bench, the method including partitioning functionality of the test bench between a simulation engine and one or more scripted routines within a single executable program. Steinmetz does not describe or suggest the claimed invention, and in fact, distinctly points away from the claimed invention.

Steinmetz describes a hardware design verification system including simulator means, test script means and dispatch means, each of which is a separate executing computer program under control of an operating system that provides for concurrent execution of computer programs. (Col. 3, lines 3-6; Col. 3, lines 20-24). In particular, hardware design verification system 100 includes a number of program modules that execute concurrently on a time-sharing operating system. (Col. 4, line 66 through Col. 5, line 3). The program modules include simulation environment 101, test script 103 and dispatch module 105. (Col. 5, lines 21-22; Col. 5, lines 36-37; Col. 5, lines 47-48). Simulation environment 101 provides the resources for modeling the operation of circuit under test 115 and master model 113. (Col. 5, lines 22-27). Test

script 103 is designed to test particular features of circuit under test 115. (Col. 5, lines 37-38). Dispatch module 105 bridges the executing test script 103 and simulation environment 101 by forking off the test script and the simulation environment as child processes that run independently of the dispatch means, which is the parent process. (Col. 3, lines 26-29; Col. 5, lines 47-51). Dispatch module 105 communicates with simulation environment and with test script 103 via data socket-based packet communication. (Col. 56-59).

Unlike the claimed invention, Steinmetz does not describe or suggest partitioning functionality of a test bench between a simulation engine and one or more scripted routines within a single executable program. Indeed, Steinmetz' system uses separate executable programs to implement simulation environment 101, test script 103 and dispatch module 105. This distinction is significant, because the claimed methods offer several advantages over the Steinmetz approach. Indeed, the claimed methods allow faster communication between the simulation engine and the scripted routines than Steinmetz' socket-based communication approach. As a result, the claimed methods require less overhead than the Steinmetz system, in which communication between test scripts 103 and simulation environment 101 occurs only via sockets.

Because Steinmetz does not describe or suggest the claimed invention, applicants respectfully request that the §102(b) rejection of claim 1 be withdrawn. Because claim 5 depends from claim 1, applicants further respectfully request that the §102(b) rejection of claim 5 be withdrawn.

Reply to Rejections Under 35 U.S.C. § 103(a)

Claims 55 and 56 have been rejected under § 103(a) as obvious over Steinmetz in view of McJones. Independent claim 55 recites a method for providing a design test bench, the method including using multiple threads to partition functionality of the test bench between a simulation engine and one or more scripted routines while maintaining a single-threaded nature of simulation. Indeed, as summarized in the substitute specification of this application:

> It is important to note that, even though TCL_PLI is multi-threaded, and that every interpreter is run on a dedicated thread, the essential single threaded nature of VERILOG simulations is maintained. Only one call to $tclExec can be reached in the VERILOG simulation at any given time. The VERILOG simulation stalls until this call returns, which occurs

> when the Tcl interpreter calls tclServer_verilogCall or when the script completes. tclServer_verilogCall, on its part, only returns when the next call to $tclExec is encountered in the VERILOG simulation. This means that, even though many Tcl scripts may be in the process of execution at any given moment in time, only one of them or the VERILOG code itself is running at that moment. All event scheduling and execution order is still under the control of the simulator.

(Substitute Specification, Page 15, line 27 through Page 16, line 2).

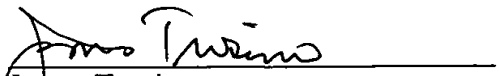
Unlike the claimed invention, neither Steinmetz nor McJones, alone or combined, describe or suggest a method for providing a design test bench, the method including using multiple threads to partition functionality of a test bench between a simulation engine and one or more scripted routines while maintaining a single-threaded nature of simulation. Indeed, Steinmetz does not describe or suggest anything regarding a multi-thread hardware design verification system, and McJones does nothing more than describe multithread processing. Further, the combination of Steinmetz and McJones does not describe or suggest the claimed invention.

Because the cited references do not describe or suggest the claimed invention, applicants respectfully request that the rejection of Claim 55 under § 103(a) be withdrawn. Further, because Claim 56 depends from Claim 55, applicants respectfully request that the rejection of Claim 56 under § 103(a) also be withdrawn.

Conclusion

For the reasons stated above, applicants submit that this application, including claims 1, 5, and 55-58, is allowable. Applicants therefore respectfully request that the Examiner allow this application.

Respectfully submitted,



James Trosino
Registration No. 39,862
Attorney for Applicants